

Application No.:10/810,435

Docket No.: JCLA11487

**REMARKS****Present Status of the Application**

Office Action rejected all presently-pending claims 1-18. Specifically, the Office Action rejected claims 1-4, 7-10, 13-15 under 35 U.S.C. 102(b), as being anticipated by Park et al. (US 6,395,637). The Office Action rejected claims 6, 12 and 18 under 35 U.S.C. 103(a) as being unpatentable over Park in view of Katayanagi (US 6,486,765). The Office Action also rejected claims 5, 11, 16-17 under 35 U.S.C. 103(a) as being unpatentable over Park in view of Sia (US 6,650,220).

Applicants have amended claims 1, 6, 7, 12, 13 and 18 to more clearly define the present invention. Applicants have also newly added claims 19-23. The limitation added in claims 1, 7, 13 and the limitation of the new claims 19-23 are shown in Fig. 1 and Figs. 4A-4C, and no new matter is entered. After entry of the foregoing amendments, claims 1-23 remain pending in the present application, and reconsideration of those claims is respectfully requested.

**Rejection under 35 U.S.C 102 (b)**

*Applicants respectfully traverse the 102(b) rejection of claims 1-4, 7-10, 13-15 because Park et al. (US 6,395,637) does not teach every element recited in these claims.*

In order to properly anticipate Applicants' claimed invention under 35 U.S.C 102, each and every element of claim in issue must be found, "either expressly or inherently described, in a single prior art reference". "The identical invention must be shown in as complete details as is contained in the .... claim. Richardson v. Suzuki Motor Co., 868 F. 2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989)." See M.P.E.P. 2131, 8<sup>th</sup> ed., 2001.

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In Park's reference, the metal layers 15, 21 and 44 shown in Fig. 8 are metal wires of the spiral inductor. In particular, the metal layers 15, 21 and 44 have the same shape. Park discloses the spiral dielectric pattern 16 is as an etching mask to form the metal wire 15 (see col. 5, line 51-55), such that the metal wire 15 is a spiral metal layer. Thereafter, a spiral photoresist pattern 23 is formed on the dielectric layer 22a, being the same shape as that of the metal wire 15 (see col. 6, lines 1-3), and the dielectric layer 22a is patterned by using the spiral photoresist pattern 23 as an etching mask to form a spiral dielectric layer 22, and then the metal layer 21a is patterned by using the spiral dielectric layer 22 as an etching mask to form a metal wire 21 having a spiral shape (shown in Fig. 4C-4D). In addition, Park only discloses the spiral metal wire 44 is formed by patterning the dielectric layer 41 in a photolithography manner (see col. 7, lines 36-45), but Fig. 8 shows the spiral metal wire 44 has a shape the same to the metal wires 15, 21. ***Therefore, Park teaches the metal layers 15, 21, 44 have the same shape, and thus the metal layers 15, 21, 44 are completely overlapping*** (Fig. 8 also shows the three layers 15, 21, 44 are completely overlapping).

However, the present invention is related to a method of fabricating an inductor as claim

1 recites:

Claim 1. A method of fabricating an inductor formed on a substrate having at least one first dielectric layer thereon, the method comprising:

forming a patterned first metal layer and a first inductor pattern within the first dielectric layer;

forming a patterned second dielectric layer on the first dielectric layer for covering the first metal layer, the first inductor pattern and the first dielectric layer, the second dielectric layer having pluralities of first openings and second openings, wherein the first openings expose the first metal layer and the second openings expose the first inductor pattern;

filling a metal within the first openings and the second openings for forming a second metal layer within the first openings and a second inductor pattern within the second openings,

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wherein the second metal layer electrically connects with the first metal layer and the second inductor pattern electrically connects with the first inductor pattern; and

forming a patterned third metal layer on the second metal layer and a third inductor pattern on the second inductor pattern, wherein the third metal layer electrically connects with the second metal layer, the third inductor pattern electrically connects with the second inductor pattern, *and the first inductor pattern and the third inductor pattern are not completely overlapping.*

In claim 1 of the present application, the first inductor pattern formed within the first dielectric layer and the third inductor pattern formed on the second inductor pattern are not completely overlapping. The first inductor pattern and the third inductor pattern are not completely overlapping, and thus they may have similar or different patterns. However, Park fails to disclose, teach or suggest that the first inductor pattern and the third inductor pattern are not completely overlapping.

Therefore, Park does not teach every element recited in claim 1. Applicants respectfully submit that independent claim 1 patently defines over the prior art reference, and should be allowed. For at least the same reasons, dependent claims 2-4 patently define over the prior art as a matter of law.

Moreover, the present invention also provides an inductor as claim 7 recites:

Claim 7. An inductor formed on a substrate having at least one dielectric layer thereon, comprising:

- a first inductor pattern formed within the dielectric layer;
- a second inductor pattern formed on the first inductor pattern and electrically connecting therewith; and
- a third inductor pattern formed on the second inductor pattern and electrically connecting therewith, *wherein the first inductor pattern and the third inductor pattern are not completely overlapping.*

In claim 7 of the present application, the first inductor pattern and the third inductor pattern are not completely overlapping. However, as discussed above, Park discloses the three metal

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wires 15, 21, 44 have the same shape and are completely overlapping, but fails to teach the first inductor pattern and the third inductor pattern are not completely overlapping. Therefore, Park does not teach every element recited in claim 7. Applicants respectfully submit that independent claim 7 patently defines over the prior art reference, and should be allowed. For at least the same reasons, dependent claims 8-10 patently define over the prior art as a matter of law.

Furthermore, the present invention also provides a method of fabricating an inductor as claim 13 recites:

Claim 13. A method of fabricating an inductor formed on a substrate having at least one first dielectric layer thereon, comprising:

forming a patterned first metal layer and a first inductor pattern within the first dielectric layer;

forming a patterned second dielectric layer on the first dielectric layer for covering the first metal layer, the first inductor pattern and the first dielectric layer, the second dielectric layer having pluralities of first openings and second openings, wherein the first openings expose the first metal layer and the second openings expose the first inductor pattern; and

forming a second metal layer filling the first openings and on the second dielectric layer and forming a second inductor pattern filling the second openings and on the second dielectric layer, *wherein the second metal layer electrically connects with the first metal layer and the second inductor pattern electrically connects with the first inductor pattern, and the first inductor pattern and the second inductor are not completely overlapping.*

In claim 13 of the present application, the first inductor pattern formed within the first dielectric layer and second inductor pattern formed by the step of filling the second openings are not completely overlapping. The first inductor pattern and the second inductor pattern may have similar or different patterns. However, as discussed above, Park discloses the metal wires 15, 21, 44 have the same shape and are completely overlapping, but Park fails to teach that the first inductor pattern and the second inductor pattern are not completely overlapping.

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Therefore, Park does not teach every element recited in claim 13. Applicants respectfully submit that independent claim 13 patently defines over the prior art reference, and should be allowed. For at least the same reasons, dependent claims 14-15 patently define over the prior art as a matter of law.

**Rejection under 35 U.S.C 103 (a)**

*Applicants respectfully traverse the rejection of claims 6, 12 and 18 under 103(a) as being unpatentable over Park in view of Katayanagi (US 6,486,765) because a prima facie case of obviousness has not been established by the Office Action.*

To establish a prima facie case of obviousness under 35 U.S.C. 103(a), each of three requirements must be met. First, the reference or references, taken alone or combined, must teach or suggest each and every element in the claims. Second, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skilled in the art, to combine the references in a manner resulting in the claimed invention. Third, a reasonable expectation of success must exist. Moreover, each of the three requirements must "be found in the prior art, and not be based on applicant's disclosure." See M.P.E.P. 2143, 8<sup>th</sup> ed., February 2003.

Applicants submit that, as disclosed above, Park fails to teach or suggest each and every element of claims 1 and 7 from which claims 6 and 12 depend. The device disclosed by Katayanagi comprises two spiral inductors 11 and 12 electrically isolated by a dielectric layer 17. In other words, the two spiral inductors 11 and 12 are not electrically connected to each other.

However, the inductor (as claim 7 recites) and the method of fabricating an inductor (as claim 1 recites) comprises first, second and third inductor patterns, and the first inductor pattern

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is electrically connected to the second inductor pattern while the second inductor pattern is electrically connected to the third inductor pattern, wherein the first inductor pattern and the third inductor pattern are not completely overlapping. *Katayanagi does not teach the device comprises three inductor patterns electrically connected to each other, and the first and third inductor patterns are not completely overlapping.*

Moreover, the method of fabricating an inductor (as claim 13 recites) comprises the step of forming the first inductor pattern and the step of forming the second inductor pattern, wherein the second inductor pattern electrically connects with the first inductor pattern, and the first inductor pattern and the second inductor are not completely overlapping. Katayanagi fails to teach *the second inductor pattern electrically connects with the first inductor pattern* and the first and second inductor patterns are not completely overlapping.

Therefore, Katayanagi cannot cure the deficiencies of Park. The two references combined do not teach each and every element in independent claims 1, 7 and 13, and thus claims 1, 7 and 13 are patentable over Park and Katayanagi. For at the least the same reasons, their dependent claims 6, 12 and 18 are also be patentable as a matter of law.

In particular, the limitation of claims 6 and 12 is that a three-dimensional inductor structure constituted of the first inductor pattern, the second inductor pattern and the third inductor pattern has an area, and at the area the first inductor pattern does not connect with the third inductor pattern via the second inductor pattern for making a current only flowing along the first inductor pattern when the current first time flows through the area and the current only flowing along the third inductor pattern when the current second time flows through the area. The limitation of claim 18 is that a three-dimensional inductor structure constituted of the first inductor pattern and

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the second inductor pattern has an area, and at the area the first inductor pattern does not connect with the second inductor pattern for making a current only flowing along the first inductor pattern when the current first time flows through the area and the current only flowing along the third inductor pattern when the current second time flows through the area.

The structure disclosed by Katayanagi only comprises two spiral inductors 11 and 12 electrically isolated from each other. However, in claims 6, 12, *the first, second and third inductor patterns are electrically connected to each other and at the area the first inductor pattern does not connect with the third inductor pattern*. In claims 18, *the first and second inductor patterns are electrically connected to each other and at the area the first inductor pattern does not connect with the second inductor pattern*. Katayanagi fails to teach or suggest said feature. The two references combined do not teach each and every element in claims 6, 12 and 18 and should be allowed.

*Applicants respectfully traverse the rejection of claims 5, 11, 16-17 as being unpatentable over Park in view of Sia (US 6,650,220) because a prima facie case of obviousness has not been established by the Office Action.*

Similarly, as disclosed above, Park fails to teach or suggest each and every element of claims 1, 7 and 13, from which claims 5, 11, 16-17 depend. Sia fails to disclose, teach or suggest the device comprises the first inductor pattern, the second inductor pattern (and the third inductor pattern), and the first inductor pattern, the second inductor pattern (and the third inductor pattern) are different to each other. Sia just discloses the device comprises a parallel spiral stacked inductor 122 embedded within dielectric layers. Sia does not teach the device further comprises

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other metal layers. Sia cannot cure the deficiencies of Park. Therefore, the two references combined do not teach each and every element in independent claims 1, 7 and 13, and thus claims 1, 7 and 13 are patentable over Park and Sia. For at the least the same reasons, their dependent claims 5, 11, 16-17 are also be patentable as a matter of law.

**Newly added claims**

The feature of the newly added claims 19, 21 that is the first inductor, the second inductor pattern and the third inductor pattern are different to each other is not disclosed in the cited references. Moreover, The feature of the newly added claim 23 that is the first inductor pattern and the second inductor pattern are different to each other is not disclosed in the cited references. In addition, the feature of the newly added claims 20, 22 that is the bottom surface of the second inductor pattern is completely contacts with the first inductor pattern while the top surface of the second inductor pattern is completely contacts with the third inductor pattern is not disclosed in the cited references.



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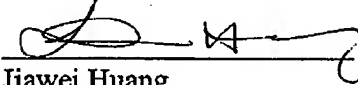
**CONCLUSION**

For at least the foregoing reasons, it is believed that the pending claims are in proper condition for allowance. If the Examiner believes that a telephone conference would expedite the examination of the above-identified patent application, the Examiner is invited to call the undersigned.

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